

10. [12 points] For the following questions, determine if the statement is ALWAYS true, SOMETIMES true, or NEVER true, and circle the corresponding answer. Justification is not required.

- a. [2 points] Suppose $H(x)$ is a continuous function such that $H'(x) > 0$ and $H(x) \geq 0$ for all x . Then $H(x)$ is a cumulative distribution function (cdf).

Circle one: ALWAYS **SOMETIMES** NEVER

- b. [2 points] If a_n is a sequence of positive numbers, and the sequence $S_n = a_1 + \cdots + a_n$ converges to S , then a_n converges to S .

Circle one: ALWAYS SOMETIMES **NEVER**

- c. [2 points] The average value of a continuous function $f(x)$ on the interval $[0, 1]$ is given by $\int_0^1 xf(x) dx$.

Circle one: ALWAYS **SOMETIMES** NEVER

- d. [2 points] $\int_2^3 \frac{1}{x \ln(x)} dx = \int_2^3 \frac{1}{u} du$.

Circle one: ALWAYS SOMETIMES **NEVER**

- e. [2 points] If n is a fixed number which is bigger than 100, and $\text{MID}(n)$ and $\text{LEFT}(n)$ both estimate $\int_0^{\pi/2} \cos(x) dx$, then

$$\int_0^{\pi/2} \cos(x) dx \leq \text{MID}(n) \leq \text{LEFT}(n).$$

Circle one: **ALWAYS** SOMETIMES NEVER

- f. [2 points] If $r = f(\theta)$ is a polar curve, then the arclength of the part of the curve in the first quadrant is given by $\int_0^{\pi/2} \sqrt{(f(\theta))^2 + (f'(\theta))^2} d\theta$.

Circle one: ALWAYS **SOMETIMES** NEVER